

Alex El-Shaikh

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Citizenship Dual German and Egyptian nationality

GitHub <https://github.com/alexelshaikh>



Software engineer with a PhD in Computer Science and several years of experience in the technical leadership of complex software projects. Focus on scalable system architectures, requirements engineering, and the coordination of development processes in industrial environments.

Professional Experience

04/2026 – Present

Senior Software Engineer

- **Design** and development of scalable **backend** architectures using **Java/Spring Boot** in a cloud environment (**AWS**)
- Integration of Amazon **Cognito** and **S3** into production systems
- Development and maintenance of batch and scheduled tasks (**Spring Scheduler**)
- Responsibility for backend and **database architecture** decisions
- Integration and optimisation of relational databases (**Amazon Aurora, PostgreSQL, MariaDB**)
- Analysis and **optimisation** of existing software architectures to improve **performance** and scalability
- Ensuring code quality through **clean code** principles, code **reviews**, and **testing**

02/2025 – 03/2026

Postdoctoral Researcher, Imperial College London, United Kingdom

- **Led development** of **distributed** and scalable system architectures and **database systems**
- **Improved** system **performance** by up to **50%** through query optimisation, architectural design, and **concurrency** tuning (e.g., [Optimistic Locking](#), [Virtual Threads](#), [Structured Concurrency](#))
- Processing of terabyte-scale datasets
- Deployment of scalable services using **container technologies**
- **Teaching** lectures, tutorials, and workshops in **software engineering, architecture, and database systems**
- **Supervision** of **student** thesis projects with technical guidance and feedback

11/2019 – 12/2024

Research Fellow, Marburg University

- **Doctoral degree** in computer science (Grade: 1.0 – very good)
- Development of scalable **RESTful** web services (**Spring Boot**, FastAPI) for an interdisciplinary research community
- Work with **SQL** and **NoSQL** databases including **PostgreSQL**, **Redis**, **MongoDB**, and **Elasticsearch**
- Optimisation of ChronicleDB (**event streaming**) via caching and dynamic indexing
- **Teaching** software engineering, architecture, and **database systems**
- Project: **NFDI4Biodiversity** (National Research Data Infrastructure)
 - **Standardisation** of biodiversity **data formats**
 - Design of **S3-compatible APIs** for object storage
 - Development of **ETL pipelines** integrating **heterogeneous data** sources

03/2014 – 10/2019

Research Assistant, Marburg University

- Organisation and **supervision** of **student groups**
- **Supervision** of **students** in **Java** programming internships
- Academic support in linear algebra, analysis, logic, **object-oriented programming**, software engineering, and **database systems**

Education

11/2019 – 12/2024

PhD in Computer Science, Marburg University

- Awarded the title “Doctor of Natural Sciences (Dr. rer. nat.)”
- Dissertation title: “Implementing random access on DNA data storage systems” (Grade: 1.0 – very good)

01/2016 – 10/2019

M.Sc. in Computer Science, Marburg University

- Master’s thesis title: “Lightweight Indexing on Data Streams” (Grade: 1.3 – very good)
- Minor subject: Economics
- Aug 2016 – Dec 2016: ERASMUS Semester at Aalto University in Helsinki, Finland
 - Enhanced English proficiency
 - Exposure to Finnish academic, cultural, and social environment

03/2012 – 12/2015

B.Sc. in Computer Science, Marburg University

- Bachelor’s thesis title: “Developing an Android game with an interactive water simulation” (Grade: 1.3 – very good)
- Minor subject: Business Administration

Technical Skills & Expertise

Programming Languages	Java (very good), Python (very good), SQL (very good), Rust (good), C#, C++, R, Scala, JavaScript, Kotlin, Lua, Prolog, Julia, Haskell
Backend & Cloud	Spring Boot, AWS, REST APIs
Data & Streaming	PostgreSQL, MongoDB, Apache Kafka, Apache Spark, Elasticsearch, Neo4j, HBase
Tools	Maven, Docker, Kubernetes, CI/CD, JUnit, Pandas, FastAPI, JDBC, JPA, JOOQ
Methods & Working Style	Requirements engineering, agile software development (Scrum/Kanban), systems analysis and solution design, technical project coordination
Areas of Expertise	Database systems, software architecture, object-oriented and modular programming, algorithms and optimization, data processing, parallel programming, software refactoring
Language Skills	German and Arabic (mother tongues), English (level C1)
Interests	Sports (swimming, table tennis), travel, teaching, debates